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DETERMINATION OF THE SEX OF THE OFFSPRING FROM A SINGLE PAIR OF *PEDICULUS* *VESTIMENTI*.

KATHARINE FOOT.

Nuttall (1917) gives a summary of the data as to the proportion of the sexes in *Pediculus vestimenti*. He says "the proportion of the sexes as determined by raising experiments has yielded contradictory results," and this he thinks is due to the small number of the broods of the experiments. In his own experiments of mixed pairs he found the sexes nearly equal, though his broods also were small.

Hindle (1917) discovered a marked inequality in the proportion of the sexes of certain pairs, and he concludes this to be the normal condition, basing this conclusion on the determination of the sex of 25 single pairs.

It has been proved by the observations of several investigators that a single female may deposit from one hundred to nearly two hundred eggs. It is obvious, therefore, that the sex must be determined for at least one hundred of a generation or the results are inconclusive. Certainly at least 75 per cent. of the eggs deposited must hatch and the sex be determined for these nymphs.

Hindle secured such a small number of individuals from each of his 25 pairs that Nuttall seems more than justified in questioning his conclusions. The number of individuals in each of the 25 broods studied by Hindle is as follows: 2, 4, 6, 9, 8, 10, 11, 12, 15, 17, 24, 25, 26, 26, 27, 29, 30, 31, 32, 34, 36, 38, 45, 48, 64. Fifteen of these 25 broods were all males or all females, *e.g.*, the brood of two were both females, the brood of four were also females, one of the broods of nine were males and the other brood of nine were both males and females. The brood of sixty-four were all females but as they probably do not represent more than 50 per cent. of the offspring from that pair, the evidence, even in this case, is without force.

METHODS AND RESULTS.

In order to determine the sex of as large a number of the offspring as possible I adopted a different method from that of other investigators. Instead of waiting for the nymphs to mature in order to determine the sex, they were dissected at any stage that was convenient and those that died were not discarded but dissected at once and the sex recorded. It was thus possible to determine the sex of nearly all that were hatched.

Our method of treating these insects makes it possible to collect and isolate the eggs deposited each day, thus keeping an accurate count of the number of eggs deposited daily and the number hatched.

Both the male and the female had the third moult in the laboratory, the female July 22, 1919, and the male July 24.

The male died August 26; he lived therefore 33 days after maturity, thus exceeding the average length of life of *P. vestimenti* males. The female died September 5. She lived therefore 45 days after maturity, eleven days longer than the average length of life of the females. She continued to deposit eggs daily after the death of the male. She deposited in all 143 eggs (116 before the death of the male and 27 after that date). She commenced to lay eggs the 4th day after maturity and stopped laying 2 days before she died. She deposited 2, 3, 4 or 5 eggs each day. Of the 116 eggs laid before the male died, 11 failed to hatch, but nearly all developed and three of the nymphs partly emerged. Of the 27 eggs laid after the male died, seven failed to hatch, but all were fertilized and four of the nymphs partly emerged.

The nymphs were raised in lots of 20, and the death rate was relatively low in lots 1, 2, 3 and 4. The death rate in lots 5 and 6 was much higher. Several of the nymphs died even before the first moult. In some of these cases the nymphs were too dry to dissect, and therefore the sex was undetermined. This higher death rate was probably due to the age of the female, as the death rate was progressively high towards the end of the experiment.

125 eggs were hatched and the sex was determined for 115 (62 males and 53 females). 42 died during the experiment and

these were dissected as stated above and their sex determined. Of these 27 were males and 15 females.

For the first half of the experiment the females were more numerous than the males; the proportion of males then gradually increased until the final result gave 62 males and 53 females.

These results are of value only because the sex was determined for 92 per cent. of the entire generation, but the experiment must be repeated many times before the evidence can be of scientific value.